Practitioner's Docket No. VAW-6

CHAPTER II

TRANSMITTAL LETTER TO THE UNITED STATES ELECTED OFFICE (EO/US)

(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/EP00/04148	10 May 2000 (10.05.00)	30 June 1999 (30.06.99)
International Application Number	**International Filing Date**	**International Earliest Priority Date**

TITLE OF INVENTION: METHOD FOR PRODUCING AN ALUMINUM COMPOSITE MATERIAL

APPLICANT: Kästner, Stefan

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Hon. Commissioner for Patents
P.O. Box 2327
Arlington, Virginia 22202
ATTENTION: EO/US

Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. Section 371:

CERTIFICATION UNDER 37 C.F.R. SECTION 1.10*
*(Express Mail label number is **mandatory.**)*
(Express Mail certification is optional.)

I hereby certify that this paper, along with any document referred to, is being deposited with the United States Postal Service on this date December 27, 2001, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EV045437428US addressed to the: Hon. Commissioner for Patents, P.O. Box 2327, Arlington, Virginia 22202.

Lillian Garcia
(type or print name of person mailing paper)

Lillian Garcia
Signature of person mailing paper

WARNING: *Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. Section 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.*

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1. This express request to immediately begin national examination procedures (35 U.S.C. Section 371(f)).

2. The U.S. National Fee (35 U.S.C. Section 371(c)(1)) and other fees (37 C.F.R. Section 1.492) as indicated below:

CLAIMS FEE	(1) FOR	(2) NUMBER FILED		(3) NUMBER EXTRA	(4) RATE	(5) CALC-ULATIONS
	TOTAL CLAIMS	6	-20 =	0	x $18.00 =	$0.00
	INDEPEN-DENT CLAIMS	1	- 3 =	0	x $84.00 =	$0.00
	MULTIPLE DEPENDENT CLAIM(S) (if applicable) + $280.00					$280.00
BASIC FEE	U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in Section 1.482 has been paid to the U.S. PTO and no international search fee as set forth in Section 1.445(a)(2) has been paid to the U.S. PTO for the international application: where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 C.F.R. Section 1.492(a)(5)) $890.00					$890.00
	Total of above Calculations					= $1,170.00
SMALL ENTITY	Reduction by 1/2 for filing by small entity, if applicable. Affidavit must be filed. (note 37 CFR Sections 1.9, 1.27, 1.28)					- $0.00
	Subtotal					$1,170.00
	Total National Fee					$1,170.00
TOTAL	Total Fees enclosed					$1,170.00

A check in the amount of $1,170.00 to cover the above fees is enclosed.

3. A copy of the international application (cover page of International Publication No. W0 01/02165 (including abstract), 7 pages of specification, 1 page of claims, and 1 page of figures) (35 U.S.C. Section 371(c)(2)).

4. A translation of the international application into the English language (7 pages of specification, 1 page claims, 1 page abstract, 1 page figures) (35 U.S.C. Section 371(c)(2)).

II. Other documents or information transmitted herewith:

1. A copy of the international application Request.

2. A copy of a Notice Informing the Applicant of the Communication of the International Application to the Designated Offices.

3. A copy of the International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a).

1u/019706

JC13 Rec'd PCT/PTO 27 DEC 2001

4. A copy of the International Preliminary Examination Report (PCT/IPEA/409) including German language annex (an English language translation will be transmitted under 37 C.F.R. §§ 1.495(e) and (c)).

5. An unexecuted declaration of the inventor.

The above items are being transmitted before 30 months from any claimed priority date.

AUTHORIZATION TO CHARGE ADDITIONAL FEES

The Commissioner is hereby authorized to charge any additional fees, or to credit any overpayments, that may be required by this paper and during the entire pendency of this application to Account No.: 06-1075

Date: December 27, 2001

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November 29, 2001

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A METHOD FOR PRODUCING AN ALUMINIUM COMPOSITE MATERIAL

The invention relates to a method for producing an aluminium composite material in which a cladding sheet is placed onto at least one side of a core ingot, and in which the core ingot with cladding sheets in place, is subjected to several roll passes. Furthermore, the invention relates to a method for producing cladding sheets from an ingot.

The production of aluminium composite materials comprising at least two different aluminium materials (i.e. two different aluminium alloys) is particularly advantageous for various applications or it makes it possible to use aluminium materials for particular applications. In this context, cladding by rolling represents a method for producing aluminium composite materials which makes it possible in a simple way to produce large quantities of aluminium composite strip or foil.

The actual cladding by rolling takes place in several steps, wherein the deformability during rolling depends on the particular material. If the limit of deformability is reached, the rolling process has to be interrupted and renewed heating, to the rolling temperature (above the recrystallisation threshold), has to be carried out. The ingot thickness as a starting format for hot rolling is selected such that even when thick sheets are rolled, the

best possible kneading of the cast structure is achieved. The higher the material is alloyed and the lower the temperature during the last pass of the rolling material being rolled, the higher the hardening remaining in the material. In the case of plates or sheets intended for cladding by rolling, this may under certain circumstances lead to difficulties if these products do not achieve the specified strength values in the hot-rolling state on the available roll stands. Cladding by rolling takes place approximately at temperatures of 250 °C to 400 °C without intermediate annealing, with a lubricant comprising rolling oil, rolling emulsion or a mixture of rolling oil and rolling emulsion.

By producing aluminium composite materials, the properties of different aluminium materials can be combined in an optimal way. Thus for example, cladding of high-strength aluminium alloys with particularly corrosion-resistant aluminium alloys results in an aluminium composite material in which the core material provides the required strength values while at the same time the cladding material provides a surface with very good corrosion resistance which the core material could not provide because it is optimised with regard to the required strength. Furthermore, cladding makes it possible to produce an aluminium composite material with a melting point of its core material of for example 650 °C while the melting point of the cladding material is for example 620 °C. Components from such aluminium composite materials can now be interconnected in that the components are heated in a specific way to approx. 630 °C. As a result, the cladding layer melts on and ensures an coherent connection with the adjoining component.

From the state of the art it is know to produce cladding sheets or plates (for the sake of simplicity, hereinafter mostly called "sheets") for use in a generic method for producing an aluminium composite material in that a rolling ingot made of the cladding material is rolled down to the desired thickness on a hot roll. From the strip obtained in this way, plates for placement onto the core ingot are then cut off and placed onto the core ingot. Then this composite is subjected to cladding by rolling.

In this conventional method for producing an aluminium material there is a problem in that the production of cladding sheets on the hot roll is very time consuming. Such time extensive use of the hot roll for the production of cladding sheets is problematic from the point of view of optimised work processes in the rolling mill. At the same time, due to the principle of process, the parallel arrangement of cladding sheets made by rolling is poor. This results in uneven cladding which means that thicker plating sheets must be used than would be adequate with optimal plane-parallel arrangement, so as to ensure the necessary safety reserves. Furthermore, again due to inherent factors, only cladding sheets of the same thickness can be produced during the rolling process. This not only leads to increased storage expenditure for cladding sheets which are not yet used, but it also leads to increased production costs because the production of cladding sheets of different thickness means that several ingots made from the cladding material have to be subjected to a rolling process. At last, the surfaces of the cladding sheets produced by rolling must

be subjected to an expensive mechanical and chemical pre-treatment prior to rolling, so as to ensure impeccable connectability between the core ingot and the cladding sheets as a result of cladding by rolling.

It is the object of the present invention to provide a method for producing an aluminium composite material or a method for producing cladding sheets from an ingot which significantly simplifies the known processes and in addition makes it possible to use cladding sheets with improved properties.

According to a first teaching of the invention relating to a method for producing an aluminium composite material, the object explained and shown above is met in that the cladding sheets are cut off an ingot. By no longer obtaining the cladding sheets by rolling them from an ingot made of cladding material, as has been the case up to now with the state of the art, but instead, by directly cutting said cladding sheets from the ingot, there are a number of advantages when producing aluminium composite materials. First of all it is now also possible to produce cladding sheets of different thickness from one ingot; this will considerably simplify production and storage. Furthermore, with the process according to the invention, the precise number of cladding sheets required can be produced from the initial ingot without any special expenditure. The time expensive hot rolling of the ingot from the cladding material is dropped out. In addition, any re-stretching of the rolled plate, which has regularly been necessary in the case of cladding sheets made by rolling, is not apply in the case of cladding sheets which are directly cut off an ingot.

By cutting the cladding sheets from the ingot by sawing, according to an embodiment of the first teaching of the invention, an excellent plane-parallel arrangement of the cladding sheets can be achieved. Such exact plane-parallel configuration brings about an optimisation potential concerning the necessary thickness of the cladding sheets. Furthermore, the process of welding between cladding sheets and core ingots is considerably simplified. Finally this results also in reduced requirements concerning surface treatment of the cladding sheets cut off the ingot by sawing. In particular band saws are suitable for cutting cladding sheets from the ingot by sawing. In respect of ensuring plane-parallel configuration and minimum material removal, band saws are very well suited for use in the method according to the first teaching of the invention.

According to a further embodiment of the first teaching of the invention, the cladding sheets are cut off the ingot at a thickness of 2 to 100 mm. As has already been mentioned, these thicknesses can be adjusted without further ado from one cladding sheet to the other, thus providing the option of producing cladding sheets made from a single ingot for a wide range of cladding thicknesses.

Surface treatment of the core ingot and/or of the cladding sheets prior to rolling results in an optimal connection between the core material and the cladding material during the rolling process. As has already been mentioned, when compared to the requirements of cladding sheets produced by rolling, there are now significantly

reduced requirements concerning surface treatment of the cladding sheets which have for example been obtained by being cut off the ingot by sawing. This applies particularly with regard to chemical surface treatment.

According to a second teaching of the invention, the above-mentioned object for a method for producing cladding sheets from an ingot is met in that the cladding sheets are cut off an ingot. Of course, the advantages according to the invention also apply to the method, irrespective of the actual production method for an aluminium material, according to the second teaching of the invention, for producing cladding sheets from an ingot consisting of cladding material. The advantages of arranging a method for producing an aluminium material according to the first teaching of the invention can thus be transferred without further ado to a method for producing cladding sheets from an ingot according to the second teaching of the invention.

There are a multitude of options for arranging and improving the teachings according to the invention. To this effect we refer for example on the one hand to the claims which are subordinate to claim 1, otherwise also to the description of a preferred embodiment in conjunction with the drawing. The following are shown in the drawing:

Fig. 1 an embodiment of a core ingot comprising two cladding sheets, for use in a method for producing an aluminium composite material; and

Fig. 2 an embodiment of an ingot from which a cladding sheet is being cut off.

In the embodiment shown in Fig. 1, a core ingot 1 comprises a cladding sheet 2, 3 both at the top and at the bottom. The materials of the cladding sheets 2, 3 are for example corrosion-resistant aluminium materials, while the material of the core ingot 1 features high-strength.

Fig. 2 shows the production of a cladding sheet 4 made from an ingot 5 comprising the cladding material, by means of a band saw 6. For example, a band saw is arranged in front of a roll stand, said band saw cutting the rolling ingot in longitudinal direction into several cladding sheets, with the cut off cladding sheets being transported on a roller table connected directly to the core ingot. Fig. 2 shows that the method according to the invention makes it possible without further ado to cut cladding sheets 4 of different thickness and of exact plane-parallel configuration into the required number of plates.

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CLAIMS

1. A method for producing an aluminium composite material in which a cladding sheet is placed at least onto one side of a core ingot, and in which the core ingot with cladding sheets in place is subjected to several roll passes characterised in that the cladding sheets are cut off an ingot.

2. A method according to claim 1, characterised in that the cladding sheets are cut off the ingot by sawing.

3. A method according to claim 1 or 2, characterised in that the cladding sheets are cut off the ingot at a thickness of 2 to 100 mm.

4. A method according to one of claims 1 to 3, characterised in that the core ingot and/or the cladding sheets are surface treated prior to rolling.

5. A method for producing cladding sheets from an ingot, in particular for use in a method according to one of claims 1 to 4, characterised in that the cladding sheets are cut off the ingot.

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ABSTRACT

The invention relates to a method for producing an aluminium composite material in which a cladding sheet is placed at least onto one side of a core ingot, and in which the core ingot with cladding sheets in place is subjected to several roll passes, as well as a method for producing cladding sheets from an ingot. According to the invention known methods are simplified and improved in that the cladding sheets are cut off an ingot.

Fig. 2 has been provided for the abstract.

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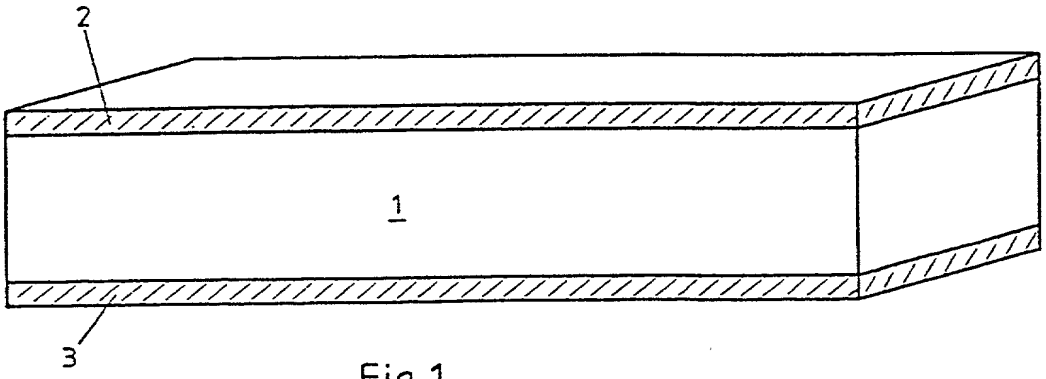

Fig.1

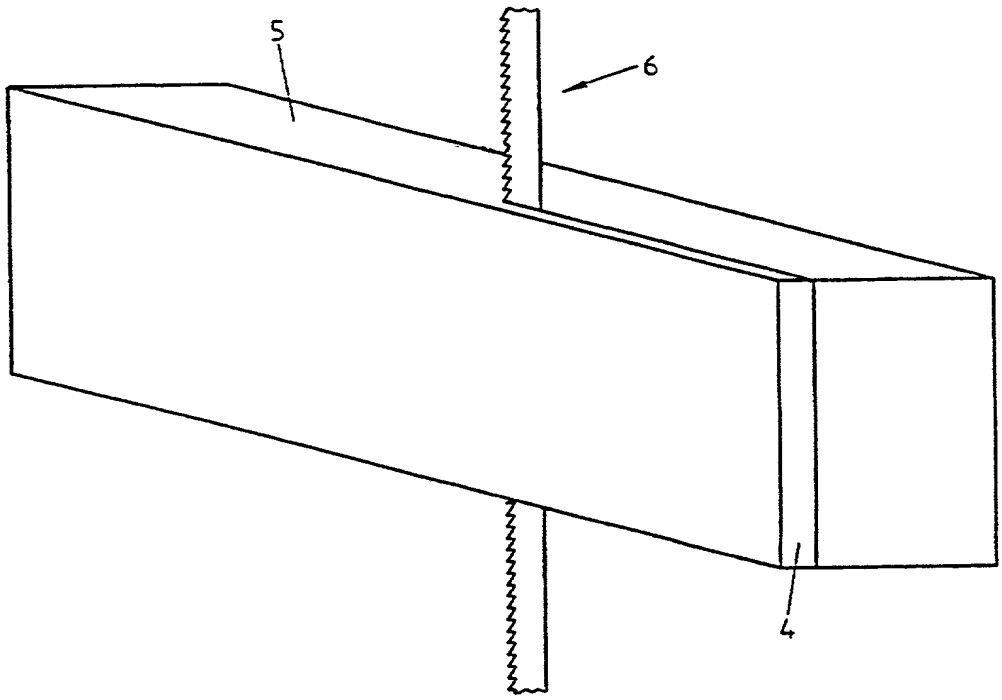

Fig.2

DECLARATION AND POWER OF ATTORNEY

(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL, CONTINUATION, OR C-I-P)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is for a national stage of PCT application PCT/EP00/04148 filed May 10, 2000.

INVENTORSHIP IDENTIFICATION

My residence, post office address and citizenship are as stated below, next to my name. I believe that I am the original, first and sole inventor *(if only one name is listed below)* or an original, first and joint inventor *(if plural names are listed below)* of the subject matter that is claimed, and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

A METHOD FOR PRODUCING AN ALUMINUM COMPOSITE MATERIAL

SPECIFICATION IDENTIFICATION

The specification of which was filed in the United States PCT Elected Office on December 27, 2001 as Application No. 10/019,706.

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56.

PRIORITY CLAIM (35 U.S.C. § 119(a)-(d))

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s)

designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

Such applications have been filed as follows.

PRIOR FOREIGN APPLICATION(S) FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119(a)-(d)

COUNTRY	APPLICATION NUMBER	DATE OF FILING DAY, **MONTH**, YEAR	PRIORITY CLAIMED UNDER 35 USC 119
Germany	19929814.9	30 June 1999	yes

POWER OF ATTORNEY

I hereby appoint the following practitioner(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Robert R. Jackson — Registration Number 26,183

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DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE

Stefan Kästner

Inventor's signature _____ **Date** 15.04.2002

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